Case Comments

Expanding Patent Coverage: Policy Implications of *Diamond v. Chakrabarty*

The present patent laws[1] provide that a patentee may receive a seventeen year right to exclude others from using his idea in consideration for his public disclosure of the idea.[2] Traditionally viewed as a reward for the inventor's efforts,[3] this right to patent protection is given for a wide variety of subjects.[4] In the recent case of *Diamond v. Chakrabarty*,[5] the Supreme Court added a new item to the list of patentable things—man-made living matter. In reaching the conclusion that a new oil-eating microorganism was patentable, the Court's majority stated that it was only construing the terms of section 101,[6] the subject matter statute of the patent system, in light of congressional intent and the common meanings of the statute's words.[7] Indeed, the majority was especially critical of any effort to inject policy considerations into patent review.[8] A careful analysis of the Court's opinion, however, reveals serious interpretive problems in the rationale used by the Court.[9] A better explanation of the holding may be that the *Chakrabarty* decision reflects a policy

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1. 35 U.S.C. §§ 1–293 (1976).

2. 35 U.S.C. § 154 (1976). *Cf.* Bloomer v. McQuewan, 55 U.S. (14 How.) 539, 549 (1852) ("The franchise which the patent grants, consists altogether in the right to exclude every one from making, using, or vending the thing patented, without the permission of the patentee.").

3. 1 A. DELLER, WALKER ON PATENTS § 6 (2d ed. 1964).

4. Patentable subject matter is limited by 35 U.S.C. § 101 (1976), which provides that a patent may be issued to the inventor of "any new and useful process, machine, manufacture or composition of matter . . . ."

5. 447 U.S. 303 (1980).

6. 35 U.S.C. § 101 (1976).

7. 447 U.S. at 307. The recent literature concerning the case similarly treats the question as a statutory interpretation problem. *See, e.g.*, Behringer, *Germ Warfare in the Patent Courts*, 31 HASTINGS L.J. 883 (1980); Cooper, *Patent Protection for New Forms of Life*, 38 FED. B.J. 34 (1979); Note, *Legislation for the Patenting of Living Organisms: Specificity, Public Safety and Ethical Considerations*, 7 J. LEG. 113 (1980); Comment, Bergy, Flook, *and Micro-organisms as Patentable Products*, 29 CATH. U. L. REV. 485 (1980); Comment, *Ownership of Living Inventions—In re* Bergy, 29 DEPAUL L. REV. 215 (1979); Comment, *Implications of the Plant Patent Act for the Patentability of Micro-organisms*, 39 MD. L. REV. 376 (1979).

8. 447 U.S. 303, 314–18 (1980).

9. *See* text accompanying notes 50–162 *infra*.

choice to allow patents not only to reward inventors for their ideas, but also to provide them sufficient time to protect prospects for commercial development.[10]

I. THE OPINION

The Supreme Court in *Chakrabarty* addressed only the issue of whether patent claims for a man-made microorganism capable of degrading four kinds of hydrocarbons were valid.[11] In 1972 Chakrabarty filed a patent application asserting claims for the process for making the microorganism, for the medium to spread it, and for the microorganism itself.[12] The Patent Office granted patents for the process and the medium[13] but rejected the claims for the microorganism.[14] The rejection was based on two grounds: first, the Patent Office held the subject was a "product of nature" like a naturally occurring organism; and second, it held that living matter was not patentable subject matter in general, whether or not man-made.[15] On appeal, the Patent Office Board of Appeals upheld the denial of the patent by agreeing that living matter in general was not patentable, reasoning that the 1930 plant patent statutes would have been unnecessary if living matter were patentable.[16] The Court of Customs and Patent Appeals, however, reversed the Board's decision, basing its reversal on its earlier holding in *In re Bergy*[17] that living matter was patentable.[18] When the Supreme Court subsequently remanded *Bergy* to be considered in light of its then-recent decision of *Parker v. Flook*,[19] the Court of Customs and Patent Appeals vacated *Chakrabarty* and consolidated the case with *Bergy*.[20] The court reaffirmed both *Bergy* and *Chakrabarty*,[21] at which point the government successfully petitioned the Supreme Court for a writ of certiorari.[22]

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10. *See* text accompanying notes 163–202 *infra*.

11. 447 U.S. 303, 307 (1980). The microorganism is unique in its ability to degrade four types of hydrocarbons. Similar ones in nature can dissolve only one. Chakrabarty created the microorganism by engineering four plasmids, or genetic pathways, into the organism. *Id.* at 305 n.1.

12. *Id.* at 305–06.

13. *Id.* at 306.

14. *Id.*

15. *Id.*

16. *Id.* at 306. The 1930 and 1970 plant patent statutes set out below provide that certain asexually and sexually reproduced plants may receive special patent or registration consideration without having to meet the full description requirements found in the general patent system. The 1930 law, 35 U.S.C. § 161 (1976), provides in part: "Whoever invents or discovers and asexually reproduces any distinct and new variety of plant, including cultivated spores, mutants, hybrids, and newly found seedlings, other than a tuber propagated plant or a plant found in an uncultivated state, may obtain a patent therefor . . . ." This section does not cover plant-type bacteria. *In re* Arzbarger, 112 F.2d 834 (C.C.P.A. 1940).

The 1970 law, 7 U.S.C. § 2402(a) (1976), provides, in part: "The breeder of any novel variety of sexually reproduced plant (other than fungi, bacteria, or first generation hybrids) who has so reproduced the variety or his successor in interest, shall be entitled to plant variety protection therefore . . . ."

17. 563 F.2d 1031 (C.C.P.A. 1977).

18. 447 U.S. 303, 306 (1980).

19. 437 U.S. 584 (1978).

20. 447 U.S. 303, 306 (1980).

21. 596 F.2d 952 (C.C.P.A. 1979).

22. 447 U.S. 303, 307 (1980). The *Bergy* claims were subsequently declared moot and dismissed because the claims were for a purification of a naturally occurring culture. 444 U.S. 1028 (1980).

In the opinion of the Supreme Court, authored by Chief Justice Burger for five members, the issue was limited to "whether respondent's microorganism constitutes a 'manufacture' or 'composition of matter' within the meaning of the statute."[23] The Court stated the issue could be resolved by a construction of section 101, in light of its contemporary meaning and without the introduction of limitations that Congress had not expressed.[24] Based on the common understanding that the terms of the statute were generally inclusive, the Court concluded their use was sufficient evidence that "Congress plainly contemplated that the patent laws would be given wide scope."[25]

The Court found support for its view in the legislative history of the patent laws.[26] Relying on letters by Thomas Jefferson encouraging adoption of a patent system,[27] the consistent use of the same terms of section 101 throughout the history of the patent statutes,[28] and the legislative history accompanying the 1952 recodification of them,[29] the Court reasoned that Congress intended to maintain a broad construction of the section.[30]

The Court, however, rejected the view that no limits to section 101 exist. Natural phenomena, such as natural minerals and gravity, were not patentable, according to the Court, because they were "'manifestations of . . . nature, free to all men and reserved exclusively to none.'"[31] The microorganism, though, was distinguishable from natural phenomena: "[B]y contrast, the patentee [had] produced a new bacterium with markedly different characteristics from any found in nature . . . . His discovery was not nature's handiwork, but his own; accordingly it [was] patentable subject matter under § 101."[32]

The Court also rejected the Government's argument that the passage of the plant patent statutes evidenced that other living matter was not patentable. First, the Court concluded that the passage of the statutes was meant merely to lower patentability requirements for plant breeders.[33] Second, "Congress recognized [in passing the plant patent acts only] that the relevant distinction was not between living and inanimate things, but between products of nature, whether living or not, and human-made inventions."[34] Third, because the Court would not read limitations into the general statute, the fact that bacteria did not receive patent protection by either the 1930 or the 1970

23. 447 U.S. 303, 307 (1980).
24. *Id.* at 308.
25. *Id.*
26. *Id.*
27. *See* Graham v. John Deere Co., 383 U.S. 1, 7–10 (1966), for a discussion of the Framers' views on which the Court relied.
28. 447 U.S. 303, 309 (1980). *See* Federico, *Commentary on the New Patent Act*, in 35 U.S.C.A. § 1, 15 (1954).
29. S. REP. NO. 1979, 82d Cong., 2d Sess. 5, *reprinted in* [1952] U.S. CODE CONG. & AD. NEWS 2394; H.R. REP. NO. 1923, 82d Cong., 2d Sess. 6 (1952).
30. 447 U.S. 303, 309 (1980).
31. *Id.* at 309 (quoting Funk Bros. Seed Co., v. Kalo Inoculant Co., 330 U.S. 127, 130 (1947)).
32. 447 U.S. 303, 310 (1980).
33. *Id.* at 311–12.
34. *Id.* at 313.

plant statutes did not indicate that Congress meant to exclude bacteria from section 101 coverage.[35]

The Court also rejected the argument that the microorganism could not be patented until Congress expressly authorized coverage. To this end, the government had argued on the basis of language in *Flook* that "the judiciary 'must proceed cautiously when . . . asked to extend patent rights into areas wholly unforeseen by Congress.'"[36] Although the Court recognized that the congressional role in the patent area was to define the scope of coverage, it went on to state that once Congress has acted, the judiciary is duty bound to construe the meaning of the statute guided by the legislative history and statutory purpose of the enactment.[37] Viewed this way, that the statute was meant to be broadly construed is evidenced by the congressional choice to use broad language consistent with the congressional objectives.[38] Thus, the Court concluded that no ambiguity existed that required additional congressional direction concerning the microorganism.[39]

The Court further stated that *Flook* could not be read to require that Congress contemplate a scientific area before a patent is available for it.[40] Indeed, the Court noted that such a view would frustrate the objectives of the patent system to promote new efforts at the edges of man's knowledge: "Congress employed broad general language in drafting § 101 precisely because such inventions are often unforeseeable."[41] Nor would the Court consider the potential hazards that might result from genetic research, noting that the research would continue regardless of the support patent protection might afford.[42] Further, the Court claimed it was without the expertise to consider policy questions like safety; accordingly, these concerns were left more appropriately to Congress.[43] Congress itself would be free to limit coverage, but the Court concluded that until this was done, section 101 "fairly embrace[d] respondent's invention."[44] Thus, because the Court concluded that the language of section 101 was to be construed consistently with the common meanings of the section's terms and the broad statutory purpose underlying the patent statutes, the microorganism was patentable.

Justice Brennan, joined by Justices White, Marshall, and Powell, dissented from the judgment on the view that microorganisms are not things for which Congress has specifically provided patent coverage. In the absence of a legislative direction or common understanding, Justice Brennan stated, it is Congress that strikes the balance between the costs of the patent monopoly

35. *Id.*
36. *Id.* at 314–15 (quoting Parker v. Flook, 437 U.S. 584, 596 (1978)).
37. 447 U.S. 303, 315 (1980).
38. *Id.*
39. *Id.*
40. *Id.*
41. *Id.* at 316.
42. *Id.* at 317.
43. *Id.*
44. *Id.* at 318.

and the need to encourage progress.[45] Judged from this vantage point, he argued, Congress, in fact, had signaled a limitation by enacting carefully limited coverage of living matter under the plant patent statutes.[46] Reflecting on the legislative history of the 1930 law, he concluded that Congress believed a limitation existed and that items outside the law, including bacteria, were excluded.[47] Similarly, Congress continued the exclusion of bacteria under the 1970 law.[48] Justice Brennan concluded, therefore, that Congress had "legislated in the belief that § 101 does not encompass living organisms."[49]

II. ANALYSIS

A. *Defining the Problem: Divergent Approaches to Statutory Construction*

The interpretive concerns expressed by both the majority and minority in *Chakrabarty* reflect the statutory problem, inherent in the patent system, of identifying patentable subjects. Because there is no common law patent right, any patent protection is available only as a privilege provided to the inventor by the state.[50] To this end, the Framers of the Constitution provided that Congress would have the permissive authority to create a patent system.[51] Congress could choose, of course, not to enact a patent system.[52] Similarly, Congress might limit, and apparently has limited, the scope of patent protection to a class of articles that is less inclusive than the class of all inventive ideas.[53] The critical problem, then, becomes the identification of the class of ideas for which Congress has chosen to provide patent protection.

As the statutory language indicates, not all inventions are patentable. The present statutes defining patentability, sections 101 to 103, establish three limiting criteria.[54] Section 101 specifies the types of things that may be patented: "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof . . . ."[55] Patentability of something that falls into one of these categories, however, is "subject to the conditions and requirements" of sections 102 and 103.[56] Respectively, these sections provide that the invention be both new and substantially different. Essentially "an amplification of 'new' in section 101,"[57] the novelty requirement of section 102 provides that a previously known or patented idea

45. *Id.* at 319.
46. *Id.*
47. *Id.* at 320.
48. *Id.* at 321.
49. *Id.* at 322.
50. 1 A. DELLER, *supra* note 3, § 6.
51. U.S. CONST. art. I, § 8, cl. 8.
52. P. ROSENBERG, PATENT LAW FUNDAMENTALS 6-2 (2d ed. 1980).
53. *Id.*
54. 35 U.S.C. §§ 101-103 (1976). Section 100 further defines parts of a § 101 "process" to include a "process, art, or method." *See* S. REP. NO. 1979, *supra* note 29, at 9.
55. 35 U.S.C. § 101 (1976).
56. *Id. See* S. REP. NO. 1979, *supra* note 29, at 10.
57. S. REP. NO. 1979, *supra* note 29, at 10.

is not again patentable.[58] The requirement of section 103 that the invention be substantially different from previous ones, or in the statutory language, not "obvious at the time the invention was made to a person having ordinary skill in the art,"[59] was a codification of a judicial standard that had developed more than a hundred years before the recodification.[60] Thus, for the inventor to receive a patent, he must establish that his invention meets all three criteria of patentability: subject matter coverage, novelty, and substantial difference from previous inventions.[61]

Section 101 poses a special problem for the patent applicant because it enumerates and thereby limits the classes of patentable subject matter. Although Congress has authority to permit patents for any "useful Art,"[62] since 1790 Congress has limited the patentable items,[63] and only relatively unimportant changes in the language have been made in subsequent enactments.[64] Each term of the present limitation—"process, machine, manufacture, or composition of matter"[65]—is significant because a claim for a patent should be described in one or another of the statutory classes.[66]

The problem, however, is that these terms defy precise definition. Although the subjects of the statute may be divided into either processes or articles,[67] the judicial and hornbook definitions of the terms listed in the statute are not specific. "Process," for example, is defined as "an act, operation, or step, or . . . a series thereof, performed upon a specified subject matter to produce a physical result."[68] For a process to be patentable, it is necessary only that the process be new; therefore, a new process that uses known objects to produce a result is patentable.[69] But a patentable process is limited generally to one that results from the application of some force that causes a physical or chemical change (though this does not include mechanical changes such as stamping or binding metal).[70]

The other patentable classes—machine, manufacture, and composition of matter—are classified generally as articles.[71] A "machine" is defined as a device that causes a particular result.[72] It may be a new combination of old

58. 35 U.S.C. § 102 (1976).

59. 35 U.S.C. § 103 (1976).

60. S. REP. NO. 1979, *supra* note 29, at 10. Although the legislative history indicates the language was drawn from previous case law, it provides little guidance as to how much difference between old and new is required. *Id. Cf.* Graham v. John Deere Co., 383 U.S. 1 (1966) (interpretations of § 103 requirement).

61. S. REP. NO. 1979, *supra* note 29, at 10.

62. U.S. CONST. art. I, § 8, cl. 8.

63. P. ROSENBERG, *supra* note 52, at § 6.01.

64. *Id.*

65. 35 U.S.C. § 101 (1976).

66. P. ROSENBERG, *supra* note 52, at § 6.01.

67. *Id.*

68. *Id.* at § 6.01[1]. *See also* Cochrane v. Deener, 94 U.S. 780, 787–88 (1876): "A process is a mode of treatment of certain materials to produce a given result."

69. 94 U.S. 780, 788 (1876).

70. 1 A. DELLER, *supra* note 3, § 15.

71. P. ROSENBERG, *supra* note 52, at § 6.01.

72. Burr v. Duryee, 68 U.S. (1 Wall.) 531, 570 (1863). *See also* P. ROSENBERG, *supra* note 52, at § 6.01[2].

parts or a new component,[73] but use of a new component in an old machine does not make the latter patentable.[74] As noted below, "manufacture" consists of those articles that cannot be placed in another category and is described as "a residual category of inventive subject matter."[75] "Composition of matter," also discussed in greater detail below, includes chemical compounds and physical mixtures or "a combination, union, or association of ingredients."[76] Accordingly, a wide range of articles are patentable under section 101, but like "process," the terms do not provide any clear limits on patentability.

In addition to the coverage provided under section 101, Congress has provided that certain asexually and sexually reproduced plants may receive patents or equivalent protection.[77] Essentially, the plant breeder must make the same showings of novelty as the inventor, but the specificity of the description[78] is reduced to a description "as complete as is reasonably possible."[79] When the plant patenting statutes are coupled with the provisions of section 101, the litany of patentable subject matter seemingly "include[s] anything under the sun that is made by man."[80]

Exceptions to patentability fall into two general categories: (1) those created by judicial application of the patent statutes and (2) those provided by Congress. Judicial exceptions exclude from patentability discoveries of laws of nature[81] and naturally occurring articles,[82] as well as any object whose novelty is the result of mental activity: for example, printed matter,[83] methods of doing business,[84] and certain computer programs.[85] These judicial exceptions from patent coverage result because the items cannot be adequately defined, are not really new, or consist only of mental steps.[86] The second general exception to patentability consists of those things Congress has legislatively precluded from patent protection. One example is the blanket statutory exception of inventions useful solely for nuclear weapons.[87] Another is found in the 1930 plant patent statute that excludes tuber propagated plants and those found in an uncultivated state.[88] Similarly, the 1970 statute specifically excludes several sexually reproduced plants, including bacteria, from

73. Seymour v. Osborne, 78 U.S. (11 Wall.) 516 (1870).
74. *In re* Hall, 208 F.2d 370 (C.C.P.A. 1953).
75. P. ROSENBERG, *supra* note 52, at § 6.01[3].
76. *Id.* at § 6.01[4].
77. *See* 35 U.S.C. § 161 (1976); 7 U.S.C. § 2402(a) (1976).
78. 35 U.S.C. § 112 (1976) requires a description "in such full, clear, concise, and exact terms as to enable any person skilled in the art . . . to make and use the same . . . ."
79. 35 U.S.C. § 162 (1976).
80. S. REP. NO. 1979, *supra* note 29, at 10.
81. *See, e.g.*, O'Reilly v. Morse, 56 U.S. (15 How.) 62 (1853).
82. *See, e.g.*, Funk Seed Co. v. Kalo Inoculant Co., 333 U.S. 127 (1948).
83. *In re* Sterling, 70 F.2d 910 (C.C.P.A. 1934).
84. Munson v. Mayor of New York, 124 U.S. 601 (1888).
85. Parker v. Flook, 437 U.S. 584 (1978).
86. P. ROSENBERG, *supra* note 52, at §§ 6.02[2]–[3].
87. 42 U.S.C. § 2181 (1976).
88. 35 U.S.C. § 161 (1976).

coverage.[89] Thus, although section 101 and the plant statutes cover a wide range of subjects, both judicially and legislatively created exceptions limit the ultimate scope of coverage.

The problem posed in *Chakrabarty*, as the Court stated, was whether the microorganism falls into one of the subject matter categories of section 101.[90] Both the majority and minority opinions recognized that Congress provided the basis on which the patentability question should be decided; as the majority stated, "Congress, not the courts, must define the limits of patentability . . . ."[91] Similarly, the minority stated, "It is the role of Congress, not this Court, to broaden or narrow the reach of the patent laws."[92] To determine the extent of coverage Congress intended, however, the majority and minority took divergent paths.

Apparently, the majority took a more expansive view of congressional intent. Specifically, the majority determined that it would look to the common meaning of the terms and the statutory intent to determine patent coverage.[93] The Court stated it would not read a limitation into coverage unless clearly expressed by Congress.[94] Given the broad statutory purpose noted previously and the lack of express congresssional limitation of that purpose, the Court concluded that patent coverage was generally inclusive or expansive.[95]

The minority, on the other hand, adopted a view that tended to exclude items from patent coverage. Initially, the minority stated that a patent should not be granted in the absence of legislative direction.[96] If there is some "evidence" of a congressional exclusion—in this case, the limited coverage of living matter under the plant patent statutes[97]—, then the patent should be denied. Otherwise, the minority concluded, "[T]he Court's decision [would] not follow the unavoidable implications of the statute."[98] Thus, the minority approach seems more exclusionary, since an express congressional exclusion was not necessary to justify a patent denial.

These divergent approaches, at one level, may explain the *Chakrabarty* opinions. Arguably, the conclusion that either the majority or minority drew as to patentability was merely a logical result of its initial choice of one approach to statutory construction over the other.

It is not enough, however, to say that *Chakrabarty* is explained by the divergent approaches to interpreting the patent statutes. Even if one accepts the inclusive approach that the majority opinion seems to advance, the evidence on which the majority relies apparently does not justify its result.

89. 7 U.S.C. § 2402(a) (1976).
90. 447 U.S. 303, 308 (1980).
91. *Id.* at 315.
92. *Id.* at 322.
93. *Id.* at 308, 315.
94. *Id.* at 308.
95. *Id.* at 308, 318.
96. *Id.* at 319.
97. *Id.* at 319–21.
98. *Id.* at 321.

Judged by the majority's criteria for interpreting the statute—the common meaning of the terms Congress chose and the express legislative intent—there is ample evidence to support the contrary conclusion that section 101 does not cover living matter such as the microorganism, or at the very least, that congressional intent is ambiguous. First, as used in section 101, the terms, "manufacture" and "composition of matter," do not seem in common usage to encompass living organisms. Second, despite the broad terms used in section 101 and the general intent expressed in its legislative history, it is also apparent that Congress enacted the plant patent statutes with the view that living matter was not patentable subject matter under prior law. Thus, even if the majority's inclusionary approach to statutory interpretation is accepted, the evidence indicates that the microorganism was not patentable under section 101.

B. *Failure of Justification*

1. *Common Meanings of Section 101 Terms*

The Court in *Chakrabarty* concluded that the microorganism fell into either the "manufacture" or "composition of matter" term of section 101.[99] In reaching this conclusion, the Court stated it was using a common or dictionary definition of each term to conclude that Congress intended an inclusive approach to the patent statute because the terms used were themselves so broad.[100] A careful analysis of the terms and the case law defining them, however, fails to support the Court's conclusion that Congress contemplated the inclusion of living matter under either "manufacture" or "composition of matter."

As indicated by both the majority and minority opinions, there was initially a general conception that the terms of the patent statute did not include living matter.[101] Moreover, given a general lack of available precedent for patentability of living matter, this view probably conformed to the general view of the patent system. As one author notes, "[P]erhaps no decision can be found because it was so commonly accepted that plants could not be patented that no one bothered to test it."[102] Similarly, at least one federal court of appeals had indicated that the patent statutes cover only mechanical types of inventions.[103] Thus, in general, the common perception of section 101 coverage was that the statute did not include living matter.

Additionally, the statutory language does not indicate a choice to include living matter. For example, the use of the term "manufacture" does not indicate that Congress meant to encompass all man-made efforts including creation of living matter. Judged by the definition the Court adopted—"the

99. *Id.* at 309–10.
100. *Id.* at 308.
101. *Id.* at 319 n.1 (Brennan, J., dissenting).
102. Behringer, *Germ Warfare in the Patent Courts*, 31 HASTINGS L.J. 883, 892 n.72 (1980).
103. Yoder Bros., Inc. v. California-Florida Plant Corp., 537 F.2d 1347 (5th Cir. 1976) (dictum).

production of articles for use from raw or prepared materials by giving these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery"[104]—there is obviously no indication that creation of living matter is "manufacture." Nor may it fairly be implied from the elements of the definition.

As defined by the Court, a "manufacture" is identified by two elements: labor and transformation. The first, that manufacture is the result of human labor, is of little help. The latin roots of the term, in fact, define a manufacture as something created by labor,[105] and arguably everything man uses requires some human labor.[106] Essentially, this aspect provides little guidance on the question of whether any man-made object is patentable, and as noted previously, the common view indicated that living matter was probably excluded. Nor does the second element of the Court's definition, transformation, provide the impetus to conclude that living matter is patentable. In the previous case law, everything from a change in color[107] to an increase in value[108] had been held to constitute the necessary transformation to result in a "manufacture" in various contexts.[109] Even within the case law standards, there are so many variations that one knows little more than that a transformation is necessary.[110]

The different interpretations of transformation are evidenced in the various standards of change that courts have adopted. For example, transformation has been explained as resulting in a "new quality which gives [a product] a new and beneficial use,"[111] or, short of a different name, results in something "new and different"[112] and having a distinctive character.[113] The term has also been defined negatively as not the artificial production of a known matter,[114] not mere processing,[115] and not a naturally occurring change.[116] These definitions alone do not suggest the encompassing quality of the term the majority urges.

Nor do the fact patterns of the cases suggest that the term is encompas-

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104. 447 U.S. 303, 308 (1980).

105. *In re* I. Rheinstron & Sons, Inc., 207 F. 119, 135 (E.D. Ky. 1913).

106. *Id.*

107. Superior Prod. Co. v. Thomas, 32 F. Supp. 360 (N.D. Texas 1938).

108. Shallus v. United States, 162 F. 653 (4th Cir. 1908).

109. Part of the problem, of course, is that the definition changes with the particular facts of the case. The Supreme Court, however, apparently regards the use of "manufacture" in the patent statutes and tariff statutes as similar and used cases concerning the latter in defining manufacture in *Chakrabarty*. For example, the Court cited Hartranft v. Wiegmann, 121 U.S. 609 (1877)—a case that concerned the definition of the term in a tariff action, *id.* at 615—to support its definition of manufacture. 447 U.S. 303, 309–10 (1980).

110. American Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1, 12, 13 (1931).

111. Steinfur Patents Corp. v. William Beyer, Inc., 62 F.2d 238 (2d Cir. 1932).

112. Hartranft v. Wiegmann, 121 U.S. 609, 612 (1877). The Court relies on this language in its opinion as well. 447 U.S. 303, 309–10 (1980).

113. *In re* I. Rheinstron & Sons, Inc., 207 F. 119, 150 (E.D. Ky. 1913).

114. Cochrane v. Badische Anilin and Soda Fabrik, 111 U.S. 293, 311 (1884). *But see* Binney & Smith Co. v. United Carbon Co., 125 F.2d 255 (4th Cir.), *rev'd on other grounds*, 317 U.S. 228 (1942) (the restructuring of a compound into a more manageable form is patentable in the new form).

115. Duke Power Co. v. Clayton, 274 N.C. 505, 164 S.E.2d 289 (1968).

116. Tide Water Oil Co. v. United States, 171 U.S. 210, 216 (1898). *But see* Carr v. FTC, 302 F.2d 688 (1st Cir. 1962) (questioning *Tide Water Oil* on the issue of necessary sufficiency of the change).

sing. For example, in one case a creation of cocktail cherries from natural cherries is a manufacture.[117] In another, the creation of rot-free oranges from natural ones is not.[118] Both subjects took on a new character, use, or quality, but as the case results suggest, the necessary amount of transformation lacks consistent definition and is hardly a reliable indicator of what change in the raw materials is sufficient to result in a manufacture. As with the requirement that labor be involved, the requirement of transformation does not indicate that Congress by its use of the term manufacture meant an inclusive definition that embraces a microorganism.

The nebulous character of the term "composition of matter" similarly fails to indicate inclusive coverage. Chief Justice Burger endorsed the view that "composition of matter" means "'all compositions of two or more substances and . . . all composite articles, whether they be the results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids.'"[119] This definition, on its face, does not include animate objects. Nor does the case law support a conclusion that it should.

The case law does suggest, of course, that "composition of matter" encompasses a broad range of articles. Obviously, it includes chemical compounds and the like.[120] It also includes new products resulting from the addition of a single substance, whether or not the new product takes on a new use.[121] Interestingly, an extract from living matter is also patentable as a "composition of matter,"[122] though extracts that result in a purification of the original product may not be.[123] Despite the breadth of the "composition of matter" coverage, however, no patent had been granted for a living organism with one unlitigated exception—the Pasteur yeast patent.[124]

Again, it is not clear that the common meaning required a conclusion that Congress meant to include generally any conceivable composition under patent protection. Simply, the common conception of patentable subject matter would tend to exclude some items such as the microorganism. Thus, although the two categories, "manufacture" and "composition of matter,"

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117. *In re* I. Rheinstron & Sons, Inc., 207 F. 119 (E.D. Ky. 1913).

118. American Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1 (1931).

119. 447 U.S. 303, 308 (1980) (quoting Shell Dev. Co. v. Watson, 149 F. Supp. 279, 280 (D.D.C. 1957)) (citing 1 A. DELLER, WALKER ON PATENTS § 14 (1st ed. 1937).

120. Shell Dev. Co. v. Watson, 149 F. Supp. 279 (D.D.C. 1957), *aff'd*, 252 F.2d 861 (D.C. Cir. 1958).

121. Rogers v. Ennis, 20 F. Cas. 1113 (C.C.N.D.N.Y. 1878) (No. 12,010). The case dealt with a new composition for birch beer. Though the result was birch beer, one ingredient was changed. The court held that this was a patentable composition of matter. While the case goes to the concept of novelty, it does demonstrate that the transformation necessary in the manufacture cases apparently is not in issue in those cases that deal with the composition of matter.

122. Merck & Co. v. Olin Mathieson Chem. Corp., 253 F.2d 156 (4th Cir. 1958) (vitamin B-12 extracted from microorganism cultures).

123. American Wood Paper Co. v. Fibre Disintegrating Co., 90 U.S. (23 Wall.) 566 (1874). The problem of extracts has changed from a subject matter question to one of novelty under § 102 or nonobviousness under § 103. The conception seems to be that the extract may be patentable subject matter, but it may not be different enough from its source to be patentable. *See, e.g., In re* Kratz, 592 F.2d 1169 (C.C.P.A. 1979); *In re* Bergstrom, 427 F.2d 1394 (C.C.P.A. 1970), for a discussion of the extract question.

124. 4 OFF. GAZ. PAT. OFF. 91 (1873).

serve as residual areas for inventions that do not fall into other areas, there is no indication that Congress meant these categories to include living matter.

The majority recognized that some exclusions do exist by its admission that some discoveries such as natural phenomena are not patentable subject matter even though it declared that man-made microorganisms are not so excluded.[125] The Court, however, erred in its reasoning that previous case law supported the conclusion that a distinction between natural and man-made organisms existed. To discover the mistake in the Court's reasoning, one must return to the patent law fundamentals found in sections 101 to 103 and compare the rationales for disallowing the natural phenomena patents with those used to disallow the "applied natural products" patents.[126]

Fundamentally, it is only for a specific application of an idea to a particular end within the definition of patentable subject matter (*i.e.*, a "process," "machine," manufacture," or "composition of matter") that one may obtain the patent.[127] The denial of patentability in the natural phenomena cases is based on a belief that natural forces, ideas, and the like, are within the general store of things available to all men when they are understood or expressed.[128] For example, high pressure injection was held not patentable in *Le Roy v. Tatham*.[129] Similarly, electromagnetism was held not patentable in *O'Reilly v. Morse*.[130] Computer programs have likewise been held to be outside the scope of patentable subject matter as a mathematical conclusion similar to a formula or law of nature.[131] Intrinsic to each of these decisions is the belief that no one has a claim to the idea or "original cause."[132] Simply, these discoveries do not evidence any application of the principle to a particular and useful end that is patentable.

The application of a natural product to a use, however, poses a different question of patentability. The issue in these cases is not whether the item falls into a patentable subject matter area, but whether something new and different is produced.[133] In a sense, the cases are similar to those dealing with

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125. 447 U.S. 303, 309 (1980).

126. "Applied natural product," in this sense, is meant to encompass the use of products in their natural state. For example, a culture of plant inoculant performs the same functions as its naturally occurring components. The only change is that one or more types of compounds are brought together.

127. Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948).

128. Parker v. Flook, 437 U.S. 584, 591–92 (1978). *See* Letter to Oliver Evans, May 1807, 5 WRITINGS OF THOMAS JEFFERSON 75–76 (Washington ed. 1871), *quoted in* Graham v. John Deere Co., 383 U.S. 1, 8 n.2 (1966).

129. 55 U.S. (14 How.) 156 (1853).

130. 56 U.S. (15 How.) 62 (1854).

131. Parker v. Flook, 437 U.S. 584, 594 (1978); Gottschalk v. Benson, 409 U.S. 63 (1972).

132. 55 U.S. (14 How.) 156, 175 (1853).

133. *See* text accompanying notes 55–60 *supra*. The 1952 revisions codified novelty requirements in 35 U.S.C. § 102, which provides, in part: "A person shall be entitled to a patent unless—(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent . . . ." The novelty question is enormously complicated. Because of the problems posed by the predecessor to § 101, the 1952 recodification separated the subject matter requirements from the novelty issue, § 102, and introduced a third requirement of nonobviousness, § 103, which previously had been a nonstatutory requirement raised by judicial interpretation. *See* Historical and Revision Notes to 35 U.S.C. § 101 (1976).

aggregates[134] because the issue is whether the aggregate is different from its component parts.[135] The Supreme Court addressed this issue in *Funk Brothers Seed Co. v. Kalo Inoculant Co.*[136] and concluded that a combination of *known* bacteria sold as a leguminous plant inoculant was not patentable. Denying the patent, the Court stated: "Each species had the same effect it always had. The bacteria perform in their natural way. Their use in combination does not improve in any way their natural functioning. They serve the ends nature originally provided and act quite independently of any effort of the patentee."[137] Like other unpatentable aggregates, the aggregate of bacteria did not provide a new result.[138] Thus, *Funk Brothers Seed Co.*, insofar as it concerns living matter, does not go to the issue of the patentability of living matter under section 101, but addresses the issue of novelty of the invention.[139]

A careful reading of the majority opinion in *Chakrabarty* reveals some confusion about the natural phenomena exclusion of section 101. The Court first noted that the microorganism is not a natural phenomena because it was uniquely created by the patentee.[140] From this first fact, however, it did not necessarily follow that the microorganism was patentable as a "manufacture" or "composition of matter"; as noted earlier, case development and legislative history simply did not reach the point that would require that conclusion. To buttress its position, though, the Court argued that the microorganism was distinct from the naturally occurring bacteria found not patentable in *Funk Brothers Seed Co.*, apparently in the belief that the earlier case dealt with section 101 concerns.[141] In this, however, the Court was apparently incorrect because *Funk Brothers Seed Co.* was not decided on those grounds, but rather the patent was denied on the issue of novelty. Thus, the distinction the Court attempts to draw between naturally occurring organisms and man-made ones lacks the very support that the Court claimed. Without the dichotomy, the Court is left without an answer to the fundamental question of whether a living object is patentable under section 101 and not excluded by a judicial or legislative exception.

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134. An aggregate is a combination of known articles. *See* 1 A. DELLER, *supra* note 3, § 27.

135. Pickering v. McCullough, 104 U.S. 310 (1881) (new machine results from the new effect created by aggregation of known parts); Reckendorfer v. Faber, 92 U.S. 347 (1875) (rubber tipped pencil in an aggregate does not perform any distinctive function different from its component parts). *See also* Wood v. Packer, 17 F. 650 (C.C.N.J. 1883) (coal cart with a chute attached for easier unloading).

136. 333 U.S. 127 (1948).

137. *Id.* at 131.

138. Justice Frankfurter concurred on an alternative basis, however. *Id.* at 134–35. He rejected the novelty claim as controlling and was critical of the Court's "law of nature" language because it could be used to frustrate any claim: all successful patents are by definition an application of some sort of phenomena to a particular end. The real problem he identified was the scope of the claim: that is, how many similar applications of a principle could the claim attempt to pre-empt from similar protection? Thus, he also did not address the subject matter consideration raised by *Chakrabarty*. *Id.*

139. As noted previously, *see* note 133 *supra*, the predecessor statute did not make the distinction between subject matter and novelty. The Court's confusing use of *Funk Brothers Seed Co.* in *Chakrabarty* may have resulted from problems associated with the predecessor statute.

140. 447 U.S. 303, 309 (1980).

141. *Id.* at 310.

In summary, the common meanings of the terms Congress used in section 101 do not support the conclusion that living matter is patentable. First, a persuasive argument can be made that the common view of the patent system excluded living matter. Second, the terms "manufacture" and "composition of matter" are so flexible as to defy definition and may be construed to be inclusive or exclusive. Finally, the distinction the Court drew between naturally occurring and man-made animate matter is not persuasive because the case law cited did not decide the particular question of subject matter coverage, but was based on a question of novelty. For these reasons, it is difficult to conclude, as the Court did, that the use of expansive terms in section 101 meant that a man-made microorganism was patentable under those terms' general meanings.

2. *Congressional Intent*

Given the lack of support for the Court's common meanings argument the second criterion for discerning patentability, congressional intent, is critical. The legislative record, however, is as cryptic as the terms Congress used.

Initially, it is important to note that the legislative history does not fill the definitional void found in the terms of section 101. The Senate Report accompanying the 1952 codification of the patent laws makes a sweeping statement that the subject matter provision covers "a machine or a manufacture, which may include anything under the sun that is made by man . . . ."[142] Congress, however, bound the section with the baggage of previous statutory language and court decisions,[143] and the *Chakrabarty* opinion indicates that reliance is placed on the pre-1952 cases to define the terms.[144] As noted previously, these earlier cases left much territory unexplored.

The lack of patent coverage for living matter is reinforced by the legislative history and enactment of the plant patent statutes. Arguably, the passage of the plant patent statutes implied that living matter was not patentable under section 101.[145] As noted previously, however, the Court adopted a different view in *Chakrabarty*.[146] Basing its decision on two factors, the Court first posited that the changes made in the plant patent law were made to express congressional disapproval of the "product of nature" doctrine developed by the Patent Office in *Ex parte Latimer*[147] and applied to cultivated plant patent claims. The opinion noted second that the changes made were responsive not to an absolute exclusion of living matter (if *Latimer* was refuted), but to the difficulties of description associated with patenting plants.[148] According to the

142. S. REP. NO. 1979, *supra* note 29, at 10.

143. *See* Zinn, Commentary on New Title 35, U.S. Code "Patents," *in* [1952] U.S. CODE CONG. & AD. NEWS 2507, 2507.

144. 447 U.S. 303, 308–09 (1980).

145. *Id.* at 320–21 (Brennan, J., dissenting).

146. *Id.* at 310–14.

147. 46 OFF. GAZ. PAT. OFF. 1638 (1889).

148. 447 U.S. 303, 312 (1980).

Court,[149] Congress adopted the plant patent statutes to lower that requirement to "a description . . . as complete as reasonably possible."[150] The Court concluded that the 1970 statutes,[151] which expanded coverage to sexually reproduced plants, reflected a similar concern.[152]

Although the Court's view has some basic appeal, a persuasive argument can be made that the 1930 and 1970 amendments were necessary because section 101 did not cover living matter. First, the courts have recognized a distinction of kind between mechanical inventions and plants to the exclusion of the latter from section 101 coverage.[153] Second, if animate matter were already within the scope of patentable subject matter, there would have been no need to enact special coverage for plants by Congress.[154] Of course, the obvious response to this argument is that Congress merely meant to lower requirements for a limited number of plant species and left all other animate matter to bear the burden of the full description requirements.[155] The legislative history of the plant statutes, however, lends support to the argument that plants were not previously within subject matter coverage.

First, the legislative record reflects more than a concern that the "product of nature" doctrine of *Latimer*[156] be overturned. According to testimony by the Patent Commissioner, the purpose of the 1930 act was "to extend the benefits of our patent system to certain agricultural discoveries"[157] because "the present patent law does not make it possible to grant patents for plants asexually produced."[158] Second, the committee report provided strong evidence that more was intended. The report included a letter from the Secretary of Agriculture that noted, "This purpose [to promote plant development] was sought to be accomplished by bringing the reproduction of such newly bred or found plants under the patent laws which at present time are understood to cover *only inventions or discoveries in the field of inanimate nature.*"[159] Finally, the committee report of the 1970 act stated, "No protection is available to those varieties of plants which reproduce sexually, that is, generally by seeds."[160] Furthermore, the report noted that the plant act was meant to

149. *Id.*

150. 35 U.S.C. § 162 (1976) provides: "No plant patent shall be declared invalid for noncompliance with section 112 of this title [the description requirements of the general patent statute] if the description is as complete as is reasonably possible."

151. 7 U.S.C. § 2402(a) (1976). *See* note 16 *supra* for the text of the statute.

152. 447 U.S. 303, 313 (1980). The legislative history does not explicitly preclude a conclusion that the purpose was to lower the description standard. H.R. REP. NO. 1605, 91st Cong., 2d Sess., *reprinted in* [1970] U.S. CODE CONG. & AD. NEWS 5082.

153. Yoder Brothers, Inc. v. California-Florida Plant Corp., 537 F.2d 1347 (5th Cir. 1976).

154. *In re* Merat, 519 F.2d 1390, 1393–94 (C.C.P.A. 1975).

155. This view is taken in *In re* LeGrice, 301 F.2d 929 (C.C.P.A. 1962), and Kim Brothers v. Hagler, 167 F. Supp. 665 (S.D. Cal. 1958), *aff'd*, 276 F.2d 259 (9th Cir. 1960).

156. 46 OFF. GAZ. PAT. OFF. 1638 (1889).

157. *Hearings on H.R. 11372 before the House Committee on Patents*, 71 Cong., 2d Sess., 5 (1930).

158. *Id.* at 6.

159. S. REP. NO. 315, 71st Cong., 2d Sess., 9 (1930) (emphasis added).

160. H.R. REP. NO. 1605, 91st Cong., 2d Sess., *reprinted in* [1970] U.S. CODE CONG. & AD. NEWS 5082, 5083.

recognize "new genetic techniques and properties."[161] The clear import of this language is that at least animate matter such as plants was not previously patentable.

The extension of this language, especially given the statement from the Secretary of Agriculture adopted in the Committee report, is that animate matter is not covered by the general terms found in section 101. As the minority noted, two arguments support this conclusion:

> First, the Acts evidence Congress's understanding, at least since 1930, that § 101 does not include living organisms. If newly developed living organisms not naturally occurring had been patentable under § 101, the plants included in the scope of the 1930 and 1970 Acts could have been patented without new legislation.
>
> . . . .
>
> Second, the 1970 Act clearly indicates that Congress has included bacteria within the focus of its legislative concern, but not within the scope of plant protection . . . . The fact is that Congress, assuming that animate objects as to which it had not specifically legislated could not be patented, excluded bacteria from the set of patentable organisms.[162]

Both arguments seem to make a great deal of sense, and both are consistent with the legislative exclusions Congress has created.

In summary, the second criterion on which the Court chose to make its decision, legislative intent, fails to justify the Court's conclusion that section 101 was expansive enough to include living matter. Although Congress apparently meant to legislate broad coverage, in essence it adopted the previous case law without affecting the definitional void the terms represent. Moreover, Congress apparently legislated the plant patent statutes in the belief that section 101 did not encompass living matter. It follows then that the Court's conclusion that the congressional history supported patentability of the microorganism is incorrect.

The problem with the Court's rationale in *Chakrabarty* appears rooted in its very justification. Simply, the decision sets two criteria that are not fulfilled: neither the common meaning of the terms nor the statutory history support patentability of the microorganism, even if one views section 101 as an inclusive standard. The solution to this problem may be that the Court has adopted a policy position that, in itself, provides a justification for the microorganism patent.

III. A POLICY APPROACH TO *CHAKRABARTY*

An initial problem in a policy analysis of *Chakrabarty* is that policy guidance in the patent area from the courts is not substantial.[163] For example, the Supreme Court usually is not willing to address this question, especially

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161. *Id.* at 5084.

162. 447 U.S. 303, 320–21 (1980) (Brennan, J., dissenting).

163. In *Chakrabarty*, the Court specifically denied that it was considering the policy implications. 447 U.S. 303, 308 (1980).

when a decision might serve to expand patent coverage.[164] Justice Brennan, in his dissent in *Chakrabarty*, presents this view of the Court's role in patent policy determinations:

> Given the complexity and legislative nature of this delicate task, we must be careful to extend patent protection no further than Congress has provided. In particular, were there an absence of legislative direction, the courts should leave to Congress the decisions whether and how far to extend the patent privilege into areas where the common understanding has been that patents are not available.[165]

Thus, when faced with a potential expansion of patent coverage, the Court usually has not undertaken the effort of reconciling the policy interests, but has chosen instead to deny the patent until the decision is overruled by congressional action.[166]

In contrast to the minority view, the majority showed considerably less restraint in attacking the interpretive questions posed by the microorganism claims. The Court stated it would not read a limitation into the patent system unless Congress clearly expressed it.[167] It further found that its role was to construe the patent statutes in light of their "broad terms to fulfill the constitutional and statutory goal of promoting 'the Progress of Science and the useful Arts' with all that means for the social and economic benefits envisioned by Jefferson."[168] The Court concluded, therefore, that a lack of congressional direction regarding living matter would not preclude a patent.[169] The Court further opined that laws often are not limited to the particular concerns Congress has contemplated.[170] The majority considered this interpretive approach especially appropriate in the patent area because otherwise the lack of anticipation of previously unthought ideas and unmade constructions would be inconsistent with patentability.[171] The Court's willingness to consider these claims by construing the statute in light of an underlying policy, however, does not explain the Court's result. Indeed, even if the Court had applied a traditional policy view of the patent system, the claim for patentability of man-made microorganisms should have been denied.

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164. Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518, 530–31 (1972). Similarly, in Parker v. Flook, 437 U.S. 584 (1978), Justice Stevens wrote:

> Difficult questions of policy concerning the kinds of programs that may be appropriate for patent protection . . . can be answered by Congress on the basis of current empirical data not equally available to this tribunal.
>
> It is our duty to construe the patent statutes as they now read, in light of our prior precedents, and we must proceed cautiously when we are asked to extend patent rights into areas wholly unforeseen by Congress.

Id. at 595–96. *Cf.* Gottschalk v. Benson, 409 U.S. 63 (1972) (similar result).

165. 447 U.S. 303, 319 (1980). If one accepts the minority view that Congress legislated in the belief that living matter is not patentable, Brennan's statement is not critical. Arguably, however, there was no congressional direction, *see* text accompanying notes 142–62, and therefore, this statement is critical to the minority's conclusion that the patent should have been denied.

166. *E.g.*, Gottschalk v. Benson, 409 U.S. 63, 73 (1972).

167. 447 U.S. 303, 308 (1980).

168. *Id.* at 315 (quoting U.S. CONST., art. I, § 8).

169. *Id.*

170. *Id.*

171. *Id.* at 316.

A. *Reward-Output Constraints Analysis*

The Court's usual analysis begins by viewing the issue of patentability as a tradeoff between, on the one hand, the benefits of encouraging progress by rewarding inventors and, on the other, the costs inherent in giving the inventor a monopoly in the use of his idea.[172] Viewed in this light, the right to a patent becomes very difficult to prove because both halves of the balance constrict patent coverage.[173] An examination of the economic policy underlying the Court's usual view of the patent system explains the constricting effect of this approach.

Historically, the patent system has been viewed as furthering a single goal of rewarding the efforts of inventors who invest their time, money, and knowledge in the development of new and useful items.[174] "The patent is a reward that enables the inventor to capture the returns from his investment in the invention, returns that would otherwise (absent secrecy) be subject to appropriation by others."[175] If the patent is a reward, then it serves an economic function only when it induces efforts that would not otherwise occur.[176] Under this analysis, if other economic rewards are sufficient to prompt inventive efforts without potential patent protection, then the patent itself has no justification and should not be awarded. The product would reach the market with the patent or without it. However, if the costs of the inventive effort are higher than what the market would return to the inventor, the patent should be given because it has provided the inventor the additional incentive to produce that the market alone could not create.[177] Viewed as rewards, therefore, patents should be made available to the limited class of inventions that would not have been undertaken but for the additional market advantage the patent grants the inventor, that is, the exclusive right to his idea for seventeen years.[178] This naturally constricts the number of patentable inventions to the few this market approach affects.

The class of patentable inventions is further constricted by the Court's view that a patent imposes unjustified monopoly costs. The monopoly is a result of the exclusive rights that the patentee has to control the use of his product.[179] Based on the assumption that the patentee is working with a product for which consumption or demand decreases as the price increases, the inventor can effectively limit the potential social usefulness of his product

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172. Justice Brennan wrote, "The patent laws attempt to reconcile this Nation's deep-seated antipathy to monopolies with the need to encourage progress." 447 U.S. 303, 319 (1980).

173. In fact, the Supreme Court has generally taken an even more aggressive stance against granting patents by requiring substantial novelty and opening channels for patent challenges for a patent's licensees. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 282 (1977).

174. 1 A. DELLER, *supra* note 3, § 6.

175. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 282 (1977).

176. Kitch, Graham v. John Deere Co.: *New Standards for Patents*, 1966 SUP. CT. REV. 293, 301.

177. *Id.* at 302. "Only the costlier innovation will be retarded in the absence of patents" because other innovations have sufficient market demand to induce their invention. *Id.*

178. 35 U.S.C. § 154 (1976).

179. *Id.*

by controlling the marketing of his invention.[180] The simple explanation is that the patentee can require a consumer to pay more for the patented product because the patent limits the number of producers to the patentee and his assignees. In effect, the patentee corners the market and sets the price not at the market price where supply and demand are roughly equal, but at the point where the patentee's return is highest. Thus, the patent injures society unless it is granted only in those cases in which other benefits of its production to society outweigh the costs society incurs from the award of the patent. The worth of the patent to society thus becomes the critical issue of patentability: is the patented product worth a seventeen year monopoly?[181]

Drawn together, the two halves of the traditional test of patentability reduce the scope of patentable ideas significantly. To be patentable, the subject must be one that, first, would not have been produced in the absence of potential patent protection, and second, would provide benefits that exceed the additional costs created by the monopoly effects of the patent.

If the Court had viewed the patent as a reward and placed Chakrabarty's claims into the cost and benefit balance, it should have denied the patent. The reason for the denial would have been based simply on the fact that no reward or incentive was necessary to induce the inventive effort. In rejecting arguments that the patent should not be granted because of the attendant risks of genetic research, the Court stated:

> The large amount of research that has already occurred when no researcher had sure knowledge that patent protection would be available suggests that legislative or judicial fiat as to patentability will not deter the scientific mind from probing into the unknown . . . . Whether respondent's claims are patentable may determine whether research efforts are accelerated by the hope of reward or slowed by want of incentives but that is all.[182]

Clearly, if research would continue regardless of patentability, then the incentive justification alone does not explain the Court's decision. Indeed, the claims would not reach the second step of balancing the benefits and costs of the monopoly rights. Therefore, the patent for the microorganism is not justified by a traditional patent system analysis.

B. *Prospect Analysis*

If the purpose of the patent system goes beyond providing an incentive to inventors, however, a patent for the microorganism may be justified. The alternative justification may be based on viewing the patent as a claim or prospect. A patent, viewed in this way, creates in the inventor a right to develop a novel idea free from outside interference, or in Kitch's phrase, "a particular opportunity to develop a known technological possibility."[183] The

180. Kitch, *supra* note 173, at 266–67.
181. *Id.* at 284.
182. 447 U.S. 303, 317 (1980).
183. Kitch, *supra* note 173, at 266.

patent claim is analogous to a mineral or land claim: the claim creates in its holder the right to use the land (or not to use it) in any manner he chooses regardless of its eventual commercial worth.[184] Similarly, the patent creates in its holder the right to develop his idea commercially without fear of its loss to others, regardless of the value of the idea.

There is strong evidence that the prospect function exists in the American patent system. First, the patent system encompasses both successful and unsuccessful ideas. If the patent system were only reward-oriented, thousands of patented ideas that are commercially useless would not be patentable; however, commercial worthiness has not been a criterion of patentability.[185] Second, patent rules cover not the most useful application for an idea, but the first claim.[186] If the system were purely reward-oriented, preference would be given to the former, but clearly it has not been.[187] Third, in practice a patent often is issued long before the idea is commercially marketable.[188] Thus, the practical effect of the prospect function in the American system is that it allocates to the patentee the right to attempt to develop his idea.[189]

If one recognizes that the patent system protects prospects, the key issue then becomes the recognition of a range of prospects that the system should protect. Although Kitch has not discussed this question with regard to section 101, his analysis of section 102 and section 103 seems applicable because the sections together define patentability. He states that the question of patentability centers on whether the information is worth further investigation.[190] Thus, a patentable prospect is identified as the application of an idea to a particular end that deserves further investigation, a test that provides some limitation: an idea alone is not patentable unless it is advanced in some technological application from which a benefit might result.[191] Therefore, not only are "worthy" ideas patentable, but potentially worthy ones are also.[192] By definition, then, a patent system that protects claims or prospects is more expansive than one that consists only of rewards. Thus, if the patent system is viewed as prospect-oriented, it is an encompassing system, rather than an exclusionary one.

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184. *Id.* at 271–75.

185. *Id.* at 267–69.

186. *Id.* at 269–70.

187. *See* 35 U.S.C. §§ 102, 103 (1976).

188. Kitch, *supra* note 173, at 270–72 (chart demonstrating time differences between patent approval and commercial introduction).

189. *Id.* at 266. Kitch argues that a number of benefits flow from the early allocation of a prospect. First, the allocation increases investment efficiency because the patentee can eliminate duplicative efforts. Second, it improves production because the patentee controls commercial improvements. Third, it lowers information costs of buyers because anyone wishing to use the patent knows the extent of the patentee's rights. Fourth, early release of the information lowers the waste of duplicative research. Fifth, it eliminates the costs of maintaining secrecy. Last, it improves the structure for innovation because the incentive system is generally uniform. *Id.* at 275–80.

190. *Id.* at 284.

191. *Id.*

192. *Id.*

Arguably, the Court in *Chakrabarty* moved towards recognition of the prospect function. It is clear the Court rejected internal limitations of patentability that Congress has not stated.[193] Further, the Court seemed more interested in promoting efforts without any particular regard to foreseeable benefits.[194] Noting that "the inventions most benefiting mankind are those that 'push back the frontiers of chemistry, physics, and the like,'"[195] the Court stated, "Congress employed broad general language in drafting § 101 precisely because such inventions are often unforeseeable."[196] Moreover, the Court rejected the argument that its decision would stop genetic research, a conclusion fatal to Chakrabarty's claim if the Court's decision were based only on a reward orientation.[197] The Court did note, however, that the rate of development would be affected by the hope of reward.[198] This seems consistent with the effect of an improved incentive structure that results from early allocation of prospects that Kitch hypothesized.[199] Thus, there is some evidence that the Court did view the patent system as prospect-oriented.

This evidence alone, however, is not especially effective in making the case that the Court has moved to a prospect orientation. At best, one can say that a simple reward approach would not justify the patent and then draw the few policy arguments the Court does make into a tentative argument that there is a prospect orientation influencing the opinion. Simply, the Court does not answer the single policy question posited previously—whether the claim deserves further development—and thus fails to completely adopt a prospect approach.

However, the argument of a prospect approach may be posed hypothetically. Arguably, the policy question is answered affirmatively by the Court: the microorganism's development apparently was worth pursuing. As the Court noted, "Chakrabarty's invention is *believed* to have significant value for the treatment of oil spills."[200] Moreover, the Court noted that the general idea of engineering the addition of peculiar properties into microorganisms is one that deserves further consideration.[201] Thus, the microorganism represents a prospect, the application of an idea of significance deserving further review. Judging the claim in prospect terms, therefore, the decision to grant the patent for this microorganism is consistent with a patent policy to promote technological advancement at the edges of man's knowledge for practical social benefits.[202]

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193. 447 U.S. 303, 308 (1980) (quoting United States v. Dubilier Condenser Corp., 289 U.S. 178 (1933) (Douglas, J., concurring)).

194. *Id.* at 314–15.

195. *Id.* at 316.

196. *Id.*

197. *Id.* at 317.

198. *Id.*

199. Kitch, *supra* note 173, at 279.

200. 447 U.S. 303, 305 n.2 (1980) (emphasis added).

201. *Id.* at 305 n.1.

202. *Id.* at 315.

IV. NEW DIRECTIONS

Whether this interpretation of *Chakrabarty* represents the Court's posture, of course, will be answered by its future decisions in the patent area. If the case is a harbinger of a judicial policy shift away from a reward theory limited by an output constraint bias, the significance of *Chakrabarty* is substantial. First, the case indicates a clearer and more favorable patent policy approach. Although numerous authors have suggested direct efforts by Congress to effectuate what the Court did in *Chakrabarty*,[203] the policy role of the judiciary should not be dismissed too quickly. On a day-to-day basis, specialized courts like the Court of Customs and Patent Appeals bring expertise to patent questions. An example of the policy redefinition may be found in that court's handling of recent computer software cases that, building on the Supreme Court's decisions,[204] recognize the patentability of computer processes.[205] This too may be perceived as an emergence of a prospect analysis of the section 101 definitional area, an approach that provides for changes that Congress seems unwilling to make but that are consistent with patent policy.

A second and more practical aspect of the *Chakrabarty* policy choice is the stabilizing effect it may have on inventive efforts, which clearly is one of the advantages of an inclusive patent system. There is evidence to suggest that an exclusionary process frustrates and slows development and production because either the incentive structure is uncertain or trade secrecy requirements make production costs prohibitive.[206] In the case of microorganism research, there appears little chance research will stop;[207] and clearly, the significant social benefits that are the possible result of applied genetic research may independently provide incentives.[208] Conditions for promoting research and development, however, could be disrupted, as the Court noted in *Chakrabarty*.[209] If social desires dictate that these inventions are not wanted, Congress, not the courts, might legislate the result through research and production restrictions or patent subject matter constrictions.[210] The

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203. *See, e.g.*, Note, *Legislation for the Patenting of Living Organisms: Specificity, Public Safety and Ethical Considerations*, 7 J. LEG. 113 (1980).

204. *E.g.*, Parker v. Flook, 437 U.S. 584 (1978).

205. The Court has recently permitted patents on computer processes. In Diamond v. Diehr, 101 S. Ct. 1048 (1981), the Court upheld a patent for a rubber molding process that constantly updates itself, presenting issues very much like the problem in *Flook*. In Diamond v. Bradley, 101 S. Ct. 1495 (1981) (mem.), by a 4–4 vote the Court let stand a patent for a mechanical structure for operating a multiprogram format. One article correctly anticipated that *Chakrabarty* would favorably affect the chances that these claims would be successful because they were not *per se* laws of nature or expressly excluded by Congress, the two exclusionary criteria recognized by the Court. Blumenthal & Riter, *Statutory or Non-Statutory?: An Analysis of the Patentability of Computer Related Inventions*, 62 J. PAT. OFF. 454, 516 (1980).

206. Note, *Microbiological Plant Patents*, 10 IDEA 87, 88–91 (1966).

207. *See, e.g.*, the discussion of the recent Lasker Award given for genetic research. Washington Post, Nov. 20, 1980, at 6, col. 5.

208. Note, *Legislation for the Patenting of Living Organisms: Specificity, Public Safety and Ethical Considerations*, 7 J. LEG. 113, 115–17 (1980).

209. 447 U.S. 303, 317 (1980).

210. *Id.*

patent scheme as it stands, however, will promote inventive efforts and stability in the allocation of potentially successful prospects.

Thus, the *Chakrabarty* decision poses significant policy questions that need further consideration. If the Court is moving toward a more encompassing patent system by using a prospect-oriented approach to patent policy, researchers of many important developments in various technical industries may look forward to patent protection that otherwise would not be available under a reward-oriented patent system, a result in keeping with the goal of promoting the useful arts. As usual, however, only time will tell.

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